Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Expanding Access to Mobile Wireless Services Onboard Aircraft	)	WT Docket No. 13-301
	)	

COMMENTS OF CARNEGIE TECHNOLOGIES

Carnegie Technologies ("C-Tech") hereby submits its comments on the Commission's *Notice of Proposed Rulemaking* ("*NPRM*") in the above-captioned proceeding.

Based in San Antonio, Texas, C-Tech is a "top to bottom" solutions provider for the wireless industry, developing and delivering products that simplify and create new efficiencies in business automation, collection and use of business data, billing systems and infrastructure design. C-Tech has developed SpectrumMax (www.spectrummax.com), a WiFi-based mobile calling product that is particularly suited for bandwidth-constrained environments with a limited backhaul circuit (*e.g.*, airplanes, cruise ships). C-Tech thus applauds and looks forward to prompt resolution of the *NPRM*, as it will create a new wireless market sector in the United States that, if regulated properly, will fuel innovation and competition to the ultimate benefit of the consumer.

SpectrumMax addresses the primary perceived obstacles to in-flight wireless voice calls: *i.e.*, the high cost of making an in-flight call, and potential interference to terrestrial cellular networks. As reflected in the diagrams attached hereto as Exhibit 1, SpectrumMax is an end to end solution for sending and receiving mobile voice calls, text and picture messaging, and other Rich Communications Services ("RCS") between a cellular carrier's network and a device

that has WiFi capability, even where the device is outside of the carrier's cellular coverage area. In addition to the above-mentioned services (which are standard offerings with any cellular service today), SpectrumMax's capabilities include group chat and voice messaging that works like text messaging (except that the user presses a "record" button rather than entering text before pressing "send").

The SpectrumMax solution consists of five basic elements: (1) a smartphone "app" (already available for iPhone and Android, soon to be available for Windows Mobile); (2) a broadband connection to the Internet via WiFi; (3) application servers that translate calls and messages from IP to normal cellular protocols; (4) standard terrestrial communications gateways (VoIP switch for voice calls, short message service center (SMSC) for SMS and multiple message service center (MMSC) for MMS), and (5) a visitor location register (the "VLR," which is the database of subscribers who have roamed into a given carrier's network). The caller downloads the SpectrumMax "app" onto his or her smartphone or other WiFi-capable device; the app then discerns when a WiFi signal is available to connect the device to the Internet (in this case the signal would come from the airline's in-flight WiFi service).

Once the device detects that a WiFi signal is available and a terrestrial mobile signal is not, it puts the device into "airplane mode," which turns off the device's cellular transmitter/receiver. The app notifies the SpectrumMax application servers that the device is on WiFi, and the servers in turn alert the VLR, which communicates to the relevant cellular carrier that the user is roaming. In all cases, the voice and messaging traffic passes through application servers which translate protocol (IP to cellular, cellular to IP). This notifies the carriers that they should route all communications to the user through the SpectrumMax application servers. Because all of the traffic runs through standard communications gateways, the WiFi network

appears as a roaming partner and can interface seamlessly with any 2G, 3G, or 4G terrestrial network.

The advantages of this approach are manifold. For example:

- Because voice calls are sent and received via WiFi rather than a cellular carrier's terrestrial network, the caller does not pay the higher per-minute charges that are now typical for in-flight calls.

- SpectrumMax leverages the existing capabilities of WiFi-capable devices and in-flight WiFi systems – no additional equipment installation is required. Likewise, SpectrumMax requires no additional spectrum or equipment certification (assuming the devices being used have already been certified).

- SpectrumMax addresses nearly all of the technical concerns raised in the *NPRM*: WiFi is a low power service that does not used licensed frequencies, and thus poses no meaningful risk of interference to terrestrial or satellite networks.[1] It also eliminates potential disputes over reuse of licensed terrestrial wireless spectrum.

- Because the SpectrumMax app overrides cellular network functionality in the user's device where there is no usable cellular signal, it can ensure that devices are not operating on terrestrial frequencies when a user's flight travels below the 3,000 meter threshold proposed in the *NPRM*.

- SpectrumMax is a global solution – its use of WiFi avoids any conflict between the mobile frequencies used in the United States versus those used in other countries. It also would eliminate the need for international flights to shut down their in-flight voice calling capability when they travel into the U.S.

For consumers to reap the benefits of products such as SpectrumMax, it is essential that the Commission take no action that would limit the types of technologies that an airline may use to implement in-flight voice calling., assuming any potential interference concerns are properly accounted for. It is well settled that a regulatory policy of technological neutrality creates incentives for innovation; promotes investment in research, developing and marketing of new products; and facilitates market entry and thus greater competition. For example, airlines would

[1] See *NPRM* at para. 36 (asking whether some technologies used on airborne aircraft are less likely to cause harmful interference to terrestrial networks than others).

have the option of offering products such as SpectrumMax themselves, thus opening the doors for new business models. That sort of competition-based entry is a key benefit of a "technology agnostic" regulatory approach and should be encouraged here. Otherwise, subject to the comments set forth above, C-Tech fully supports the Commission's efforts in the *NPRM* and looks forward to a prompt resolution of the relevant issues after full consideration of the record.

Respectfully submitted,

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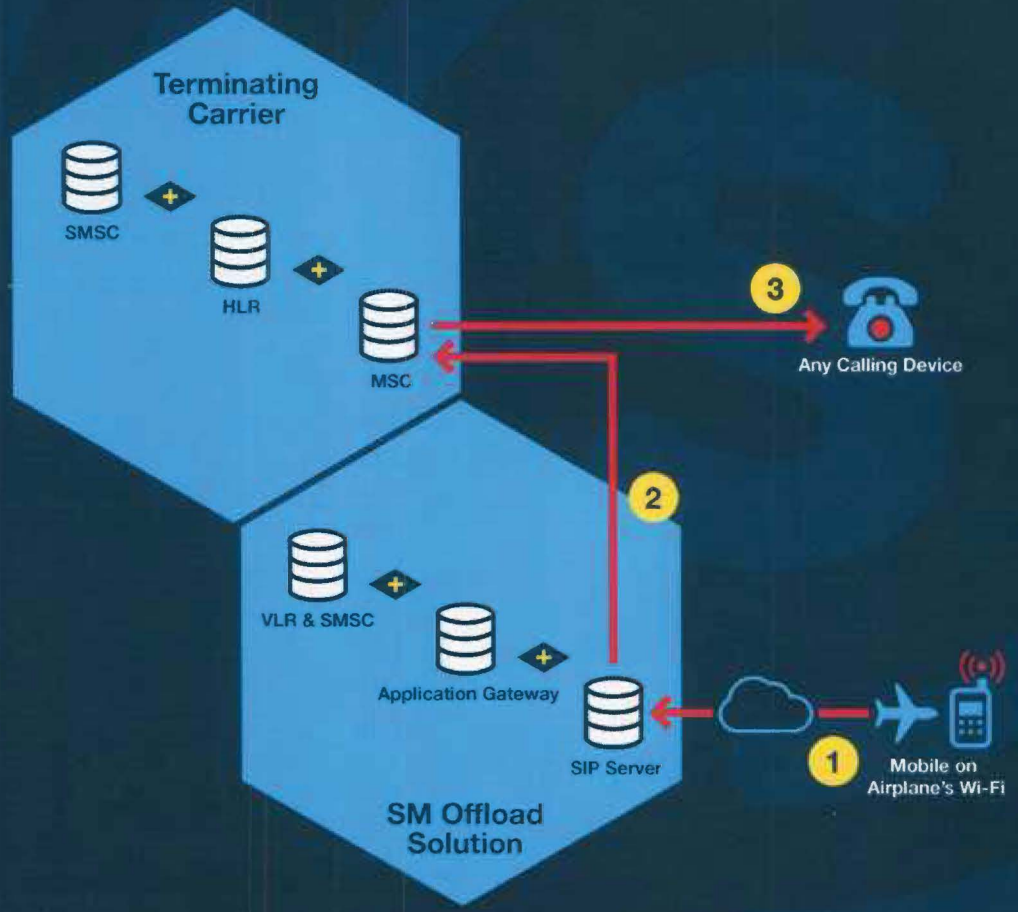
EXHIBIT 1

SpectrumMax
WI-FI OFFLOAD

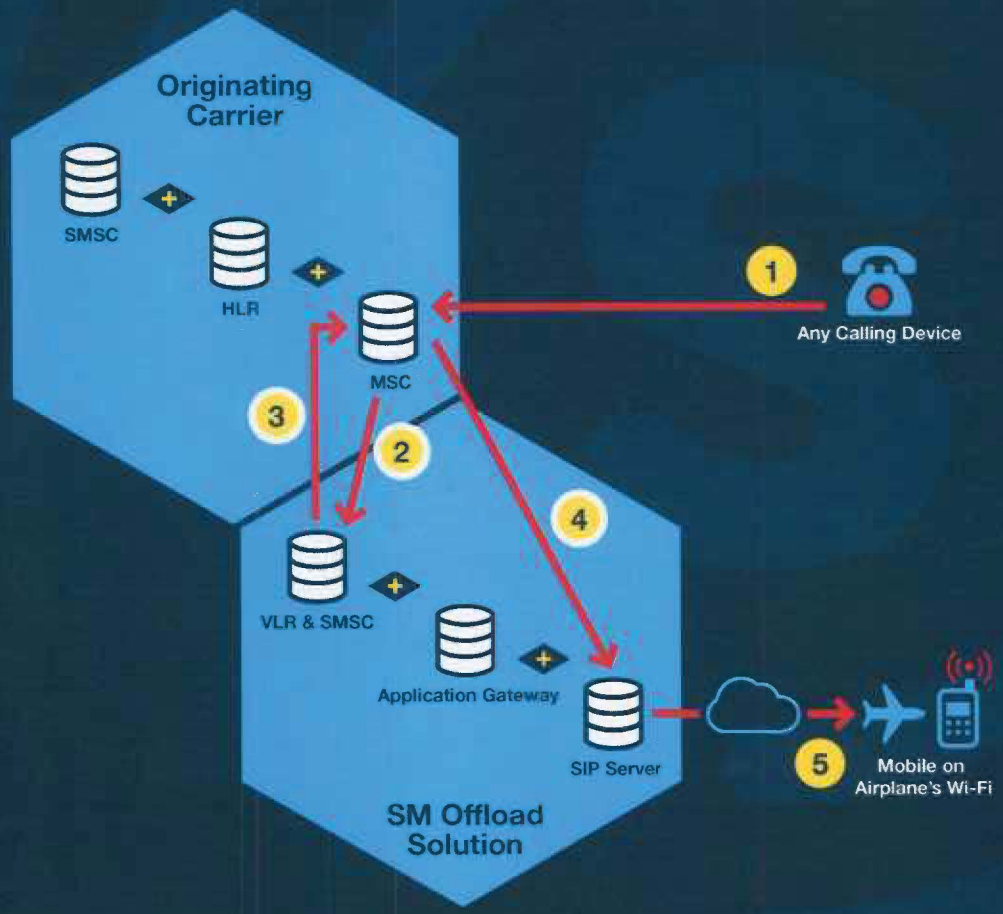
Mobile Originated Call



1. Mobile Initiates SIP call to SIP Server
2. SIP Server delivers call to Terminating Carrier MSC
3. Terminating Carrier MSC delivers to destination phone number

SpectrumMax
WI-FI OFFLOAD

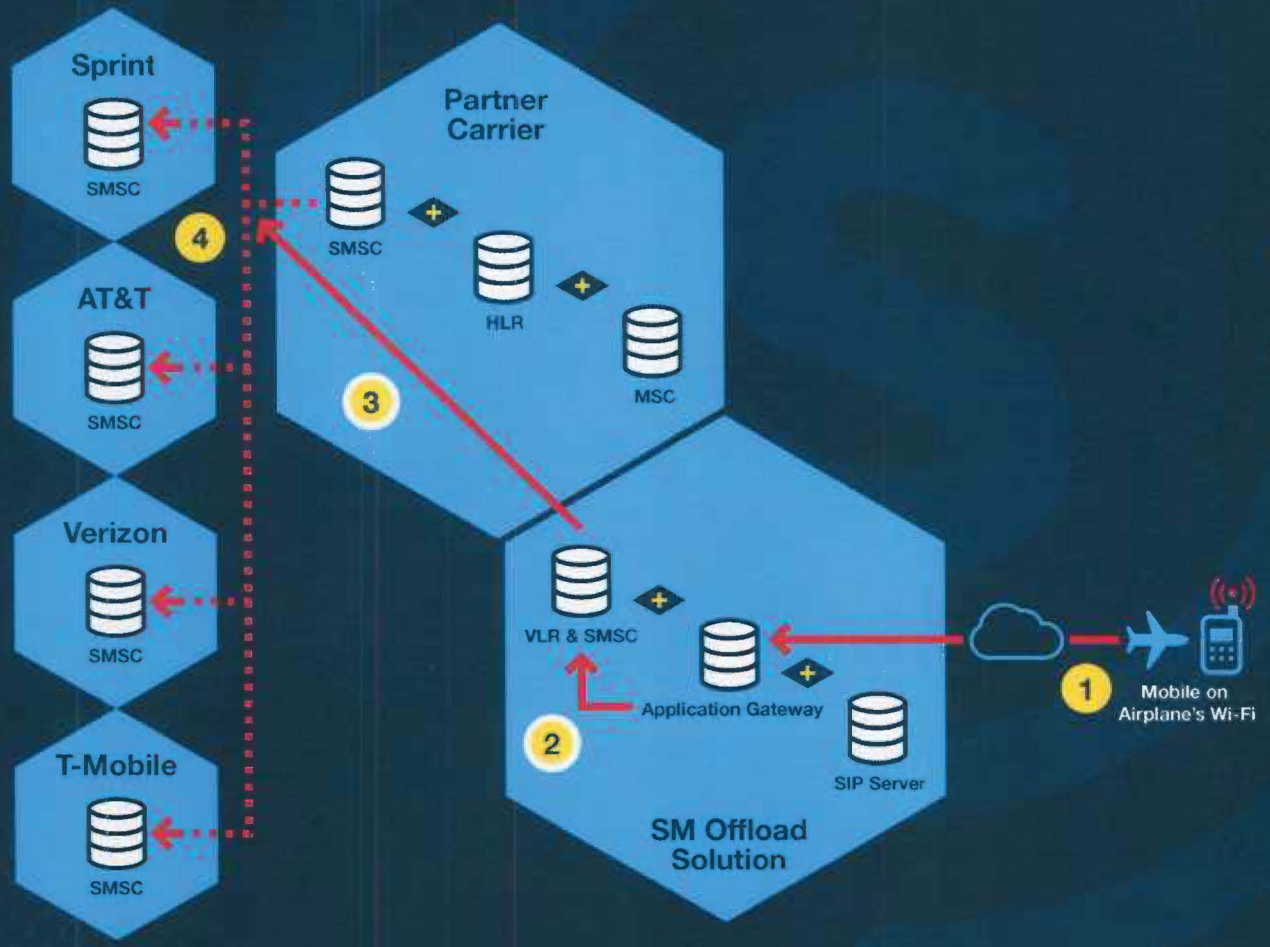
Mobile Terminated Call



1. Calling device initiates call
2. Originating Carrier MSC performs route request
3. TLDN returned to MSC
4. Call sent to SIP Server
5. SIP Server completes call to Wi-Fi Mobile

SpectrumMax
WI-FI OFFLOAD

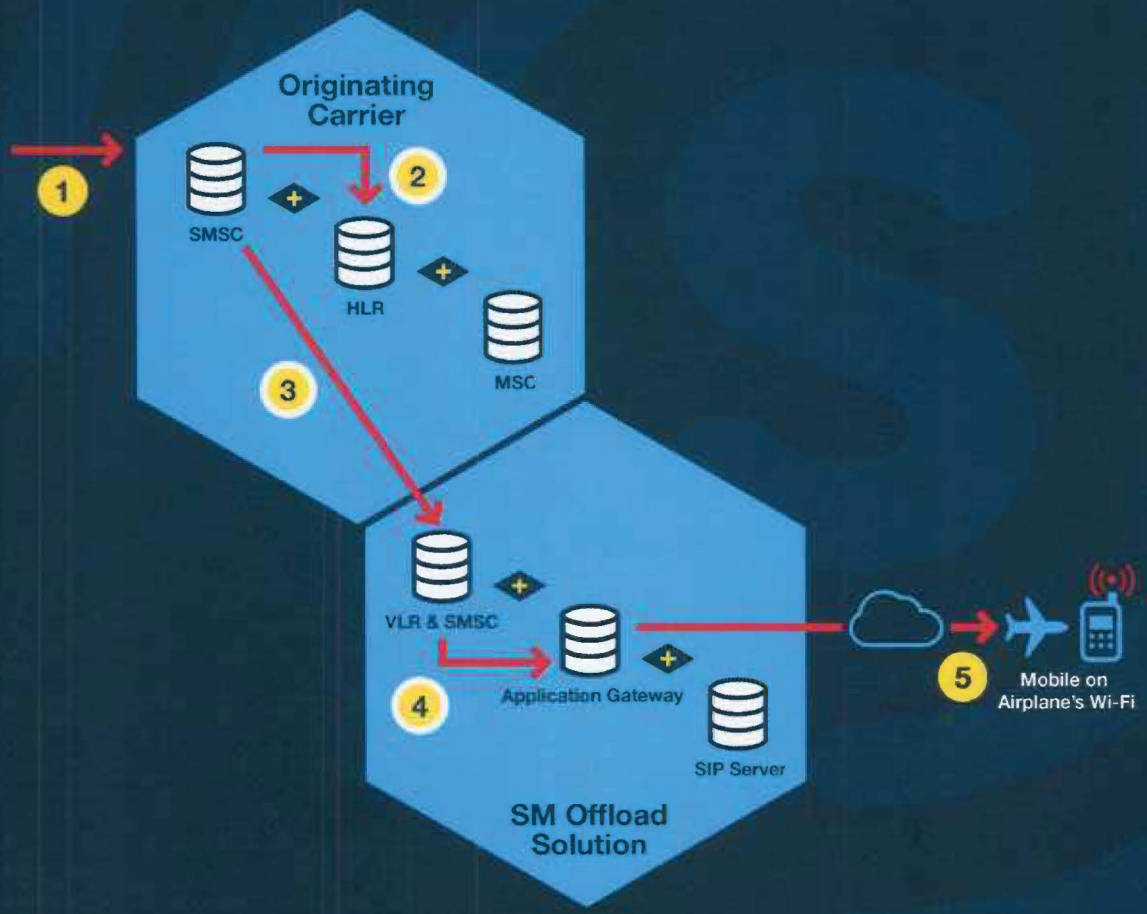
Mobile Originated SMS



1. Mobile sends SMS to Application Gateway
2. SMS forwarded to SpectrumMax's SMSC
3. SMS delivered through Partner Carrier's network to Terminating Carrier
4. Terminating Carrier SMSC delivers SMS to intended recipient

SpectrumMax
WI-FI OFFLOAD

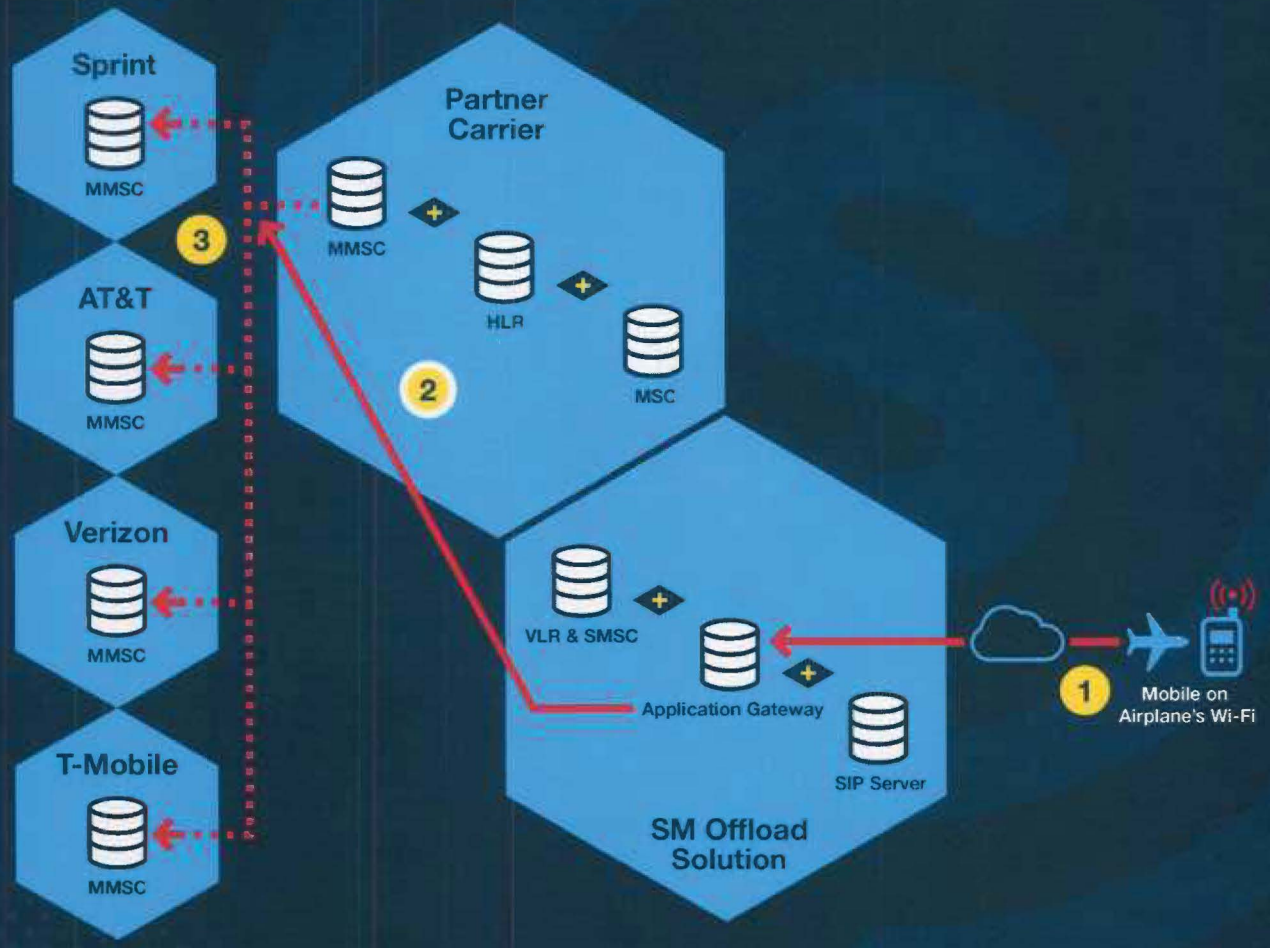
Mobile Terminated SMS



1. SMS received by Originating Carrier
2. SMSC performs location request to HLR
3. SMSC delivers SMS to SpectrumMax's SMSC
4. SMS is sent to Application Gateway
5. Application Gateway sends SMS to Wi-Fi Mobile

SpectrumMax
WI-FI OFFLOAD

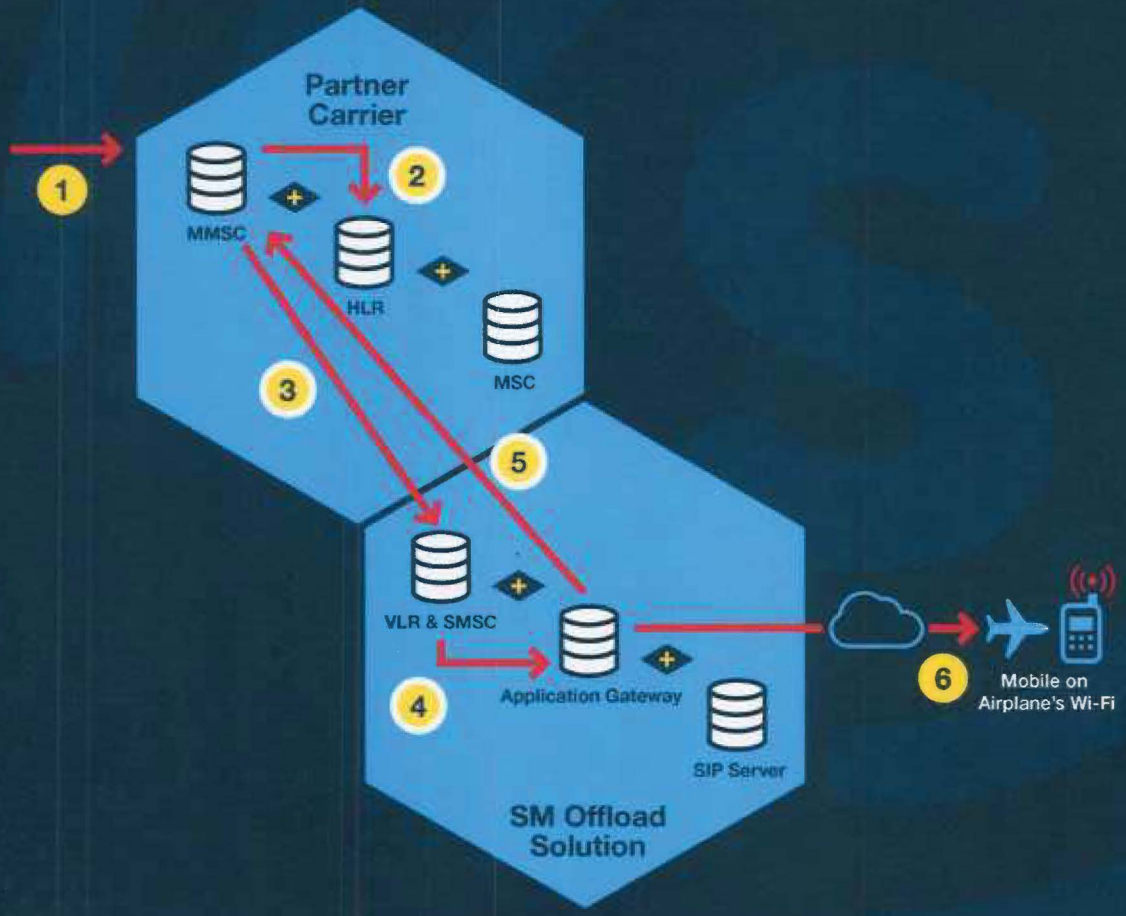
Mobile Originated MMS



1. Mobile sends MMS to Application Gateway
2. MMS delivered through Partner Carrier's network to Terminating Carrier
3. Terminating Carrier's MMSC delivers MMS to intended recipient

SpectrumMax
WI-FI OFFLOAD

Mobile Terminated MMS



1. MMS received by Partner Carrier
2. MMSC performs location request to HLR
3. MMSC delivers SMS portion of MMS to SpectrumMax's SMSC
4. SMS portion of MMS is sent to SpectrumMax's Application Gateway
5. Application Gateway strips encoded URL and retrieves MMS portion of messages from Partner Carrier's MMSC via an IP network. (Network connectivity to partner carriers MMSC + MMSC credentials are requirements)
6. Application Gateway sends MMS to Wi-Fi Mobile.